INVESTIGATOR'S ANNUAL REPORT

United States Department of the Interior

National Park Service

All or some of the information you provide may become available to the public.

OMB # (1024-0236)
Exp. Date (11/30/2010)
Form No. (10-226)

Reporting Year: 2006	**Park:** Shenandoah NP	**Select the type of permit this report addresses:** Scientific Study

Name of principal investigator or responsible official: John Skelly	**Office Phone:** 540 854-7099
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Additional investigators or key field assistants (first name, last name, office phone, office email)
No co-investigators

Project Title (maximum 300 characters):
Common and Tall Milkweed as bioindicators of ozone air pollution: NASA/GLOBE educational program "Surface Ozone Measurements and Using Sensitive Plants as Bioindicators of Ozone Air Pollution"

Park-assigned Study or Activity #:	**Park-assigned Permit #:**	**Permit Start Date:**	**Permit Expiration Date:**
SHEN-00319	SHEN-2005-SCI-0012	Oct 10, 2005	Nov 30, 2006

Scientific Study Starting Date:	**Estimated Scientific Study Ending Date:**
Oct 10, 2005	Nov 30, 2006

For either a Scientific Study or a Science Education Activity, the status is:	**For a Scientific Study that is completed, please check each of the following that applies:**
Completed	__ A final report has been provided to the park or will be provided to the park within the next two years __ Copies of field notes, data files, photos, or other study records, as agreed, have been provided to the park __ All collected and retained specimens have been cataloged into the NPS catalog system and NPS has processed loan agreements as needed

Activity Type:
Education

Subject/Discipline:
Air Pollution Effects

Purpose of Scientific Study or Science Education Activity during the reporting year (maximum 4000 characters):

Tropospheric ozone air pollution has been well-documented for its excessive concentrations at the higher elevations within the SHEN on an every summer season basis. Since the 1970's many foliar symptoms have been reported to occur on sensitive plant species including both tall (Asclepias exaltata) and common (Asclepias syriaca) milkweed. Several clonal populations of these two bioindicator species appear to be very sensitive to ozone exposures within the Big Meadows area of the SHEN. The consistently high ozone exposures at Big Meadows continues to reveal the presence of known sensitive (as observed by J.M. Skelly in August, 2005) ozone-induced symptomatic clones of both milkweed species.

The purpose of the Permit Application is to simply collect viable seeds and rhizomes of known ozone-sensitive tall and common milkweed specimens within the high elevation Big Meadows area of the SHEN. Seeds and clonal propagation from rhizomes will take place outside of the Park with emerging plantlets and new rhizomes being grown for use within a NASA sponsored project (GLOBE)-Global Learning and Observations that Benefit the Environment: "Surface Ozone Measurements and Using Sensitive Plants as Bioindicators of Ozone Air Pollution". This is a national and international project offering education for elementary and high

school teachers and their students to learn of the effects of ozone air pollution on ozone-sensitive plant life. A similar collection for the NASA/GLOBE project involving cut-leaf coneflower (Rudbeckia lacinata) is taking place within the GSMNP, Ms. Susan Sachs cooperator, NPS.

Seed pod collections will be made from no more than 5 symptomatic plants of each species; 5 robust rhizomes are requested to be collected from the soils within the center of no more than 5 selected spreading clones of each symptomatic species. Propagation will take place within a bioindicator garden with plant distributions made to participating schools through the NASA/GLOBE program.

Findings and status of Scientific Study or accomplishments of Science Education Activity during the reporting year (maximum 4000 characters):

Based upon 2005 observations and seed collections, two collections were made of rhizomes of common milkweed and tall milkweed plants showing foliar injury due to ozone air pollution. Collections were made in the SHEN's Big Meadows areas (Ranger Station Road) and along both sides of the entrance road to Big Meadows/Camp Hoover Road) May 10 and October 9, 2006 with rhizomes established within a garden setting at the PI's home (5316 Wyndemere Circle, Mineral VA, 23117). The NASA/GLOBE project referenced within the objectives has been terminated but continuing programs are being carried out by individuals who were connected with the NASA/GLOBE project with local University contacts. Plants emerging from the established rhizomes will be offered to cooperating individuals and programs offering the establishment of bioindicator gardens as a part of their educational protocols. Seeds previously collected from symptomatic plants of both species remain stored within a refrigerator, viabilty remains high and seeds will be made available to investiagtors upon request.

For Scientific Studies (not Science Education Activities), were any specimens collected and removed from the park but not destroyed during analysis?
Yes
If "Yes", identify where the specimens currently are stored:
John M. Skelly

5316 Wyndemere Circle

Mineral, VA 23117

Funding specifically used in this park this reporting year that was provided by NPS (enter dollar amount):	**Funding specifically used in this park this reporting year that was provided by all other sources (enter dollar amount):**
$0	$500

List any other U.S. Government Agencies supporting this study or activity and the funding each provided this reporting year: